



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,807	09/17/2003	Eiji Hayashi	Q77558	4057
65565	7590	11/16/2007		
SUGHRUE-265550			EXAMINER	
2100 PENNSYLVANIA AVE. NW			BOES, TERENCE	
WASHINGTON, DC 20037-3213				
			ART UNIT	PAPER NUMBER
			3682	
			MAIL DATE	DELIVERY MODE
			11/16/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/663,807	<b>Applicant(s)</b> HAYASHI, EIJI	
	<b>Examiner</b> Terence Boes	<b>Art Unit</b> 3682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 16-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 28-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>09/04/2007</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### **Request for Continued Examination**

1. The request filed on 10/12/2007 for a Continued Examination (RCE) is accepted and a continued prosecution application has been established. An action on the RCE follows.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 09/17/2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

The office has received only portions of JP 59-39352 and JP 63-132156. The office has not received complete copies of JP 59-39352 and JP 63-132156 or appropriate English language translations or English language abstracts for these references. In a telephone call with applicant's representative, Jeffrey A. Schmidt, on 11/9/07, applicant agreed to submit complete copies of JP 59-39352 and JP 63-132156 along with an appropriate English language translation or English language abstract.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 7, 8, 9, 11-13, 15, and 28- 31 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 4-116051.

JP 4-116051 discloses:

- a screw shaft (1) including a spiral-shaped ball rolling groove (1a) formed in an outer peripheral surface thereof;
- a nut (2) including a spiral-shaped ball rolling groove formed in an inner peripheral surface thereof;
- a plurality of balls (3) disposed in a ball rolling passage formed by the two ball rolling grooves;
- a ball circulation tube (5) forming a ball circulation passage and including a ball scooping portion (5a) in an end portion thereof,
- a tube guide insertion hole (2c) is formed on the nut at a position where the ball scooping portion is inserted,
- a tube guide made of resin (7, also see Japanese rejection) via which the ball circulation tube is mounted onto the nut.

- the tube guide (7) comprising: a top surface; a bottom surface; and a side surface connecting the top surface and the bottom surface (see figure 3, tube guide 7 has top and bottom surfaces and a cylindrical side surface),
- wherein a scooping portion insertion hole is formed so as to penetrate from the top surface to the bottom surface (see figure 3),
- the ball scooping portion is inserted into the scooping portion insertion hole (see figure 3),
- a tube guide insertion hole is formed on the nut at a position where the ball scooping is inserted (see figure 3).
- the side surface has a shape matched to an inner shape of a tube guide insertion hole (see figure 3),
- the scooping portion insertion hole has an inner shape matched to an outer shape of the ball scooping portion (see figure 3).
- wherein the side surface is formed in a cylindrical shape (see figures 1 and 3)
- wherein an axial line of the cylindrical shape is set perpendicular to an axial line of the nut (see figures 2 and 3)
- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).

- wherein the tube guide is interposed between the ball scooping portion and the tube guide insertion hole without any clearance between the ball scooping portion and the tube guide insertion hole (see figure 3).
- Wherein the top surface is chamfered in a smooth arc manner (see figure 3, top surface is curved matching shape of radius in tube)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 7- 9, 11-13, 15, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conant 2,882,742 in view of Merkel US 3,379,643.

Conant discloses:

- a screw shaft (10) including a spiral-shaped ball rolling groove (11) formed in an outer peripheral surface thereof;
- a nut (12) including a spiral-shaped ball rolling groove (13) formed in an inner peripheral surface thereof;
- a plurality of balls (16) disposed in a ball rolling passage formed by the two ball rolling grooves;
- a ball circulation tube (17) forming a ball circulation passage and including a ball scooping portion in an end portion thereof,

- a tube guide insertion hole is formed on the nut at a position where the ball scooping portion is inserted (see figure 6),
- a tube guide (35) via which the ball circulation tube is mounted onto the nut.
- the tube guide (35) comprising: a top surface; a bottom surface; and a side surface connecting the top surface and the bottom surface (see figure 6),
- wherein a scooping portion insertion hole is formed so as to penetrate from the top surface to the bottom surface (see figure 6),
- the ball scooping portion is inserted into the scooping portion insertion hole (see figure 6),
- a tube guide insertion hole is formed on the nut at a position where the ball scooping is inserted.
- the side surface has a shape matched to an inner shape of a tube guide insertion hole (see figure 6),
- the scooping portion insertion hole has an inner shape matched to an outer shape of the ball scooping portion (see figure 6).
- wherein the side surface is formed in a cylindrical shape (see figure 6)
- wherein an axial line of the cylindrical shape is set perpendicular to an axial line of the nut (see figure 6)

- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).
- wherein the tube guide is interposed between the ball scooping portion and the tube guide insertion hole without any clearance between the ball scooping portion and the tube guide insertion hole (see figure 6).

Conant does not disclose resin.

Merkel teaches resin (C1/L24-35) for the purpose of increasing flexibility and magnetic strength while reducing the expense of rigid metallic magnets (C1/L24-35).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Conant and provide a magnetic resin, as taught by Merkel, for the purpose of increasing flexibility and magnetic strength while reducing the expense of rigid metallic magnets.

5. Claims 4-6, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 4-116051 in view of Ebina et al. US 6,089,117.

JP 4-116051 discloses all of the claimed subject matter as described above. JP 4-116051 does not disclose wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of the ball screw.



Ebina et al. teach wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw (see figure 8) for the purpose of achieving smooth circulation of balls (C16/L45-60).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of JP 4-116051 and provide wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw, as taught by Ebina et al., for the purpose of achieving smooth circulation of balls.

JP 4-116051 further discloses:

- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).

6. Claims 4-6, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conant 2,882,742 in view of Merkel US 3,379,643, and further in view of Ebina et al. US 6,089,117.

Conant discloses all of the claimed subject matter as described above. Conant does not disclose wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of the ball screw.

Ebina et al. teach wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw (see figure 8) for the purpose of achieving smooth circulation of balls (C16/L45-60).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Conant and provide wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw, as taught by Ebina et al., for the purpose of achieving smooth circulation of balls.

Conant further discloses:

- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).

7. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conant 2,882,742 in view of Merkel US 3,379,643, and further in view of Rohlinger US 5,373,755.

Conant discloses all of the claimed subject matter as described above. Conant does not disclose a chamfered top surface.

Rohlinger teaches a chamfered top surface (see figures 4 and 6 @ 41) for the purpose of closely supporting a circulation tube while allowing for a radius to smoothly guide balls (C6/L55-65), thus avoiding an abrupt change in ball direction and improving operational efficiency.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Conant and provide a chamfered top surface, as taught by Rohlinger, for the purpose of closely supporting a circulation tube while allowing for a radius to smoothly guide balls, thus avoiding an abrupt change in ball direction and improving operational efficiency.

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-15, and 28-31 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terence Boes whose telephone number is (571) 272-4898. The examiner can normally be reached on Monday - Friday 9:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:  
10/663,807  
Art Unit: 3682


Page 11

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TB

TB

11/08/07



RICHARD RIDLEY  
SUPERVISORY PATENT EXAMINER